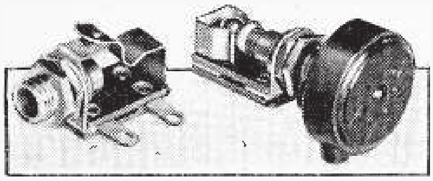
Mutton Dressed as Lamb—

ting with the point of a pencil. It is remarkable how impressive and attractive an effect can be gained by dotting a few coloured pilot lights about to show what is "on." They need not be ugly great excrescences like rear reflectors on bicycles; those shown in the photograph are only half an inch overall, and are obtainable in four colours, besides any others that you care to manufacture by painting the inner surface of the "white" window. These take low-voltage bulbs, which can usually be run off an LT supply; for mains voltage indicators a rather larger type of fitting must be used.

Measuring Instruments

For a real engineering appearance, of course, meters are immensely valuable, to say nothing about their incidental utility; but price is rather a bar, and the very cheap sort are worse than nothing, either for use or eyewash. The Ferranti 2-inch moving-coil meters are at least within the realm of practical consideration at the price of a guinea, and are genuine engineering instruments. I have had a milliammeter showing HT feed to the household receiver for the last six years; it is most valuable for showing up any abnormal condition even before one suspects it on other evidence. But if an instrument cannot be spared for a full-time job on the panel, why not put in a jack socket so that the portable meter can be plugged in as easily as the doctor applies a clinical thermometer when things seem unhealthy? There are several sorts of socket; for milliammeters there are those that maintain a closed circuit when the jack is pulled out; but for voltmeters the plain open-circuit type is obviously appropriate. Jacks are useful, too, for plugging in phones or extension lines, and for switching quickly over from one receiver to another.

A possible alternative to a meter, in certain circumstances when an exact *reading* is non-essential, is the so-called "magic eye" tuning indicator. The change of potential necessary to produce the full range of indication is from about 4 to 20 volts, according to the type of tube.



Meter sockets and jacks facilitate the checking of circuit conditions.

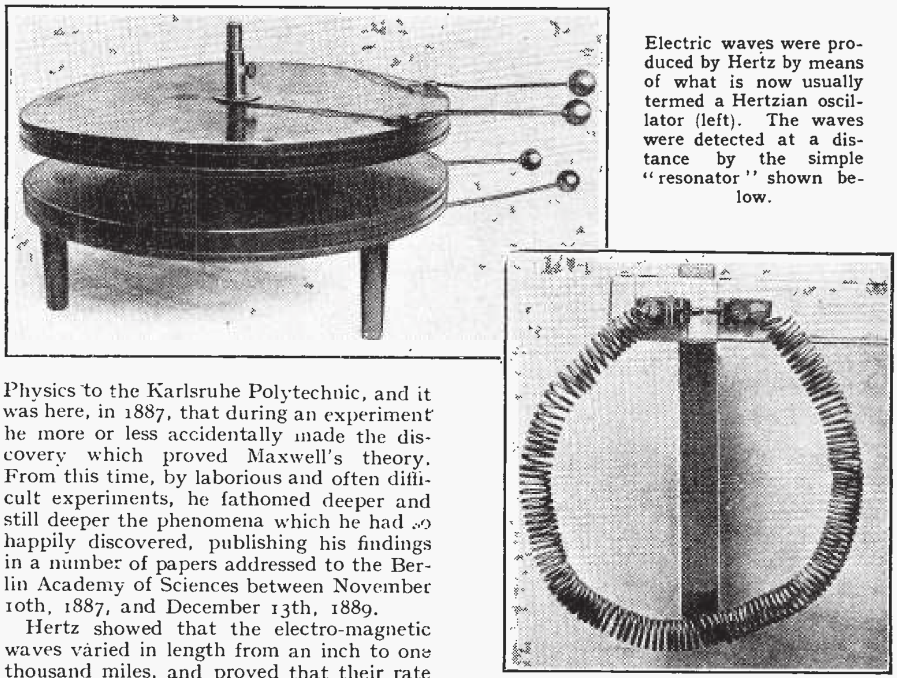
With a little window dressing it is possible to retain a satisfactory degree of self-respect even when funds are quite incapable of looking at a new receiver of a type that would do justice to one's local reputation. And, as I have tried to show, such beauty is more than skin-deep.

Fifty Years of Radio

"HERTZ effected an achievement that will hand his name down to posterity as the founder of an epoch in experimental physics." These words, coming from such an eminent scientist as Sir Oliver Lodge, sum up the magnitude of Hertz's discovery which led to the development of wireless communication.

IN 1887, just fifty years ago, Heinrich Rudolf Hertz made the epoch-making discovery that the generation of rapid oscillating electric currents set up etheric disturbances which were detectable some distance away. Although it was some few years before practical use was made of this discovery, nevertheless it was the foundation of wireless communication.

Hertz, who was born at Hamburg on February 22nd, 1857, was a professor of Theoretical Physics at Kiel when he devoted much time to the study of Clerk Maxwell's electro-magnetic theory. This theory was that a conductor charged with electricity being suddenly discharged emitted electric waves. From Kiel he went as Professor of Physics to the Karlsruhe Polytechnic, and it was here, in 1887, that during an experiment he more or less accidentally made the discovery which proved Maxwell's theory. From this time, by laborious and often difficult experiments, he fathomed deeper and still deeper the phenomena which he had so happily discovered, publishing his findings in a number of papers addressed to the Berlin Academy of Sciences between November 10th, 1887, and December 13th, 1889.



Electric waves were produced by Hertz by means of what is now usually termed a Hertzian oscillator (left). The waves were detected at a distance by the simple "resonator" shown below.

Hertz showed that the electro-magnetic waves varied in length from an inch to one thousand miles, and proved that their rate of travel corresponded with that of light, and that they possessed all the fundamental properties of light, differing from light waves only in frequency and penetrating power.

Strange it is, indeed, when it is realised that Hertz did not seem to appreciate the full significance of his discovery, for when Huber, a civil engineer in Munich, suggested to Hertz that the oscillations might be used as a means of communication without wires, he discouraged the idea. He believed that the alternations of current in the telephone were too slow in comparison with the period of the electro-magnetic oscillations for it to be utilised in conjunction with them. The idea was left for others to develop, and Hertz missed adding further to his fame.

He was a very modest man and made no attempt whatever to turn his discovery into a commercial proposition. In letters to his people in July, 1887, he wrote: "My work has at last been crowned with success. It is not for me to say whether the discovery I have made is truly wonderful, but it makes me very happy to hear other people say so; moreover, I think that only the future will be able to judge of its importance, if it has any." He was, however, not to reap the full reward of his arduous labours, nor was he to see the adaptation of his simple "exciter" or oscillator and "resonator" to the wireless transmitting and receiving stations of Marconi's early experiments, for at the very early age of thirty-seven Heinrich Hertz died at Bonn on January 1st, 1894.

The loss to science by his death is aptly expressed in the words of Helmholtz, his late professor, when referring to the appointment of a successor to the Chair of Physics at Bonn, which Hertz had held since 1889: "No choice could be made as regards finding a successor who could continue Hertz's work, for he was really unique."

The outcome of the efforts of this great scientist is everywhere apparent to-day, and the strides made in fifty years in development from so simple a piece of apparatus as that used by Hertz is truly remarkable.

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